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Neutrino oscillation physics sensitivity of Hyper-Kamiokande (18' + 2')

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Hyper-Kamiokande (HK) will be a next generation underground water Cherenkov detector, based on the highly successful Super-Kamiokande (SK) experiment. HK is the logical continuation of the highly successful program of neutrino physics and proton decay searches using a water Cherenkov technique, with an order of magnitude larger mass than predecessor experiments.

One of the main goals of HK is the study of neutrino mixing with the highest precision, using the neutrino and anti-neutrino beams produced at J-PARC together with atmospheric neutrinos.

Using the high quality neutrino beam produced at J-PARC, with anticipated beam power of 1.3MW, and highly capable near detectors, HK is expected to observe the CP asymmetry in the lepton sector for a large fraction of the parameter space.

The sensitivity has been studied with tools and assumptions based on the experience with ongoing T2K and SK experiments. With an exposure of $13 \text{ MW} \times 10^7$ seconds, the CP violating phase of the Maki-Nakagawa-Sakata matrix δ_{CP} can be measured to 7 degrees for the best case, and CP violation can be observed with more than 3σ (5σ) significance for 78% (62%) of values of delta.

By combining beam and atmospheric neutrino measurements, HK will be able to determine the mass hierarchy with more than 5σ significance.

In this talk, studies of the sensitivity to neutrino oscillation parameters, CP violating phase, θ_{23} octant, and mass hierarchy will be presented.

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